

IN THE CLAIMS:

Please amend the claims as follows:

1. Cancelled.
2. Cancelled.
3. Cancelled.
4. Cancelled.
5. Cancelled.
6. Cancelled.
7. Cancelled.

8. (Original) An isolated nucleic acid molecule encoding a mutant or variant ion channel subunit wherein a mutation event selected from the group consisting of the mutation events set forth in the following Table:

Subunit Gene	Exon/Intron	DNA Mutation
SCN1A	Exon 5	c664C→T
SCN1A	Exon 8	c1152G→A
SCN1A	Exon 9	c1183G→C
SCN1A	Exon 9	c1207T→C
SCN1A	Exon 9	c1237T→A
SCN1A	Exon 9	c1265T→A
SCN1A	Exon 21	c4219C→T
SCN1A	Exon 26	c5339T→C
SCN1A	Exon 26	c5674C→T
SCN1B	Exon 3	c254G→A
SCN2A	Exon 6A	c668G→A
SCN2A	Exon 16	c2674G→A
SCN2A	Exon 17	c3007C→A
SCN2A	Exon 19	c3598A→G
SCN2A	Exon 20	c3956G→A
SCN2A	Exon 12	c1785T→C
SCN2A	Exon 27	c4919T→A
SCN1A	Intron 9	IVS9-1G→A
SCN1A	Intron 23	IVS23+33G→A
SCN2A	Intron 7	IVS7+61T→A
SCN2A	Intron 19	IVS19-55A→G
SCN2A	Intron 22	IVS22-31A→G
SCN2A	Intron 2	IVS2-28G→A
SCN2A	Intron 8	IVS8-3T→C
SCN2A	Intron 11	IVS11+49A→G
SCN2A	Intron 11	IVS11-16C→T
SCN2A	Intron 17	IVS17-71C→T
SCN2A	Intron 17	IVS17-74delG
SCN2A	Intron 17	IVS17-74insG

CHRNA5	Exon 4	c400G→A
CHRNA2	Exon 4	c373G→A
CHRNA3	Exon 2	c110G→A
CHRNA2	Exon 4	c351C→T
CHRNA2	Exon 5	c771C→T
CHRNA3	Exon 2	c159A→G
CHRNA3	Exon 4	c291G→A
CHRNA3	Exon 4	c345G→A
CHRNA2	Intron 3	IVS3-16C→T
CHRNA3	Intron 3	IVS3-5T→C
CHRNA3	Intron 4	IVS4+8G→C
KCNQ2	Exon 1	c204-c205insC
KCNQ2	Exon 1	c1A→G
KCNQ2	Exon 1	c2T→C
KCNQ2	Exon 8	c1057C→G
KCNQ2	Exon 11	c1288C→T
KCNQ2	Exon 14	c1710A→T
KCNQ2	Exon 15	c1856T→G
KCNQ2	Intron 9	IVS9+(46-48)delCCT
KCNQ3	Intron 11	IVS11+43G→A
KCNQ3	Intron 12	IVS12+29G→A
GABRB1	Exon 5	c508C→T
GABRB1	Exon 9	c1329G→A
GABRB1	Exon 8	c975C→T
GABRG3	Exon 8	c995T→C
GABRA1	5' UTR	c-142A→G
GABRA1	5' UTR	c-31C→T
GABRA2	3' UTR	c1615G→A
GABRA5	5' UTR	c-271G→C
GABRA5	5' UTR	c-228A→G
GABRA5	5' UTR	c-149G→C
GABRB2	5' UTR	c-159C→T
GABRB2	3' UTR	c1749C→T
GABRPi	5' UTR	c-101C→T
GABRB1	Intron 1	IVS1+24T→G
GABRB1	Intron 6	IVS6+72T→G
GABRB1	Intron 7	IVS7-34A→G
GABRB3	Intron 1	IVS1-14C→T
GABRB3	Intron 7	IVS7+58delAA
GABRD	Intron 6	IVS6+132insC
GABRD	Intron 6	IVS6+130insC
GABRD	Intron 6	IVS6+73delCGCGCCACCGCCCCTTCCGC G
GABRG3	Intron 8	IVS8-102C→T

has occurred.

9. (Original) An isolated nucleic acid molecule encoding a mutant or variant ion channel subunit as claimed in claim 8 wherein a cDNA derived therefrom comprises the sequence set forth in one of SEQ ID NOS: 1-72.

10. (Original) An isolated nucleic acid molecule encoding a mutant or variant ion channel subunit as claimed in claim 8 wherein a cDNA derived therefrom has the sequence set forth in one of SEQ ID NOS: 1-72.

11. (Currently Amended) An isolated nucleic acid molecule encoding a mutant or variant ion channel subunit as claimed in ~~any one of claims 8 to 10~~ claim 8, wherein said mutation event disrupts the functioning of an assembled ion channel so as to produce an epilepsy phenotype.

12. (Currently Amended) An isolated nucleic acid molecule encoding a mutant or variant ion channel subunit as claimed in ~~any one of claims 8 to 10~~ claim 8, wherein said mutation event disrupts the functioning of an assembled ion channel so as to produce one or more disorders associated with ion channel dysfunction, including but not restricted to, hyper- or hypo-kalemic periodic paralysis, myotonias, malignant hyperthermia, myasthenia, cardiac arrhythmias, episodic ataxia, migraine, Alzheimer's disease, Parkinson's disease, schizophrenia, hyperekplexia, anxiety, depression, phobic obsessive symptoms, neuropathic pain, inflammatory pain, chronic/acute pain, Bartter's syndrome, polycystic kidney disease, Dent's disease, hyperinsulinemic hypoglycemia of infancy, cystic fibrosis, congenital stationary night blindness and total colour-blindness.

13. (Currently Amended) An isolated nucleic acid molecule encoding a mutant or variant ion channel subunit as claimed in ~~any one of claims 8 to 10~~ claim 8, wherein said mutation event disrupts the functioning of an assembled ion channel so as to produce an epilepsy phenotype when expressed in combination with one or more additional mutations or variations in said ion channel subunit genes.

14. (Currently Amended) An isolated nucleic acid molecule encoding a mutant or variant ion channel subunit as claimed in ~~any one of claims 8 to 10~~ claim 8, wherein said mutation event disrupts the functioning of an assembled ion channel so as to produce one or more disorders associated with ion channel dysfunction, including but not restricted to, hyper- or hypo-kalemic periodic paralysis, myotonias, malignant hyperthermia, myasthenia, cardiac

arrhythmias, episodic ataxia, migraine, Alzheimer's disease, Parkinson's disease, schizophrenia, hyperekplexia, anxiety, depression, phobic obsessive symptoms, neuropathic pain, inflammatory pain, chronic/acute pain, Bartter's syndrome, polycystic kidney disease, Dent's disease, hyperinsulinemic hypoglycemia of infancy, cystic fibrosis, congenital stationary night blindness and total colour-blindness, when expressed in combination with one or more additional mutations or variations in said ion channel subunit genes.

15. (Original) An isolated nucleic acid molecule comprising any one of the nucleotide sequences set forth in SEQ ID NOS: 1-72.

16. (Original) An isolated nucleic acid molecule consisting of any one of the nucleotide sequences set forth in SEQ ID NOS: 1-72.

17. (Original) An isolated nucleic acid molecule encoding a mutant KCNQ2 subunit, wherein the mutation event has occurred in the C-terminal domain of the KCNQ2 subunit and leads to a disturbance in the calmodulin binding affinity of the subunit, so as to produce an epilepsy phenotype.

18. (Original) An isolated nucleic acid molecule as claimed in claim 17 wherein the mutation event has occurred in exon 8, exon 11, exon 14 or exon 15.

19. Cancelled.

20. Cancelled.

21. Cancelled.

22. Cancelled.

23. Cancelled.

24. Cancelled.

25. Cancelled.

26. Cancelled.

27. Cancelled.

28. Cancelled.

29. Cancelled.

30. (Currently Amended) An expression vector comprising a nucleic acid molecule as claimed in ~~any one of claims 8 to 18~~ claim 8.

31. (Original) A cell comprising at least one expression vector as claimed in claim 30.

32. (Original) A cell as claimed in claim 31 comprising two or more expression vectors.

33. (Currently Amended) A cell comprising at least one ion channel type, wherein the or each ion channel type incorporates at least one mutant polypeptide, said polypeptide being a mutant or variant ion channel subunit wherein a mutation event selected from the group consisting of the mutation events set forth in the following Table:

Subunit Gene	Amino Acid Change
SCN1A	R222X
SCN1A	W384X
SCN1A	A395P
SCN1A	F403L
SCN1A	Y413N
SCN1A	V422E
SCN1A	R1407X
SCN1A	M1780T
SCN1A	R1892X
SCN1B	R85H
SCN2A	R223Q
SCN2A	V892I
SCN2A	L1003I
SCN2A	T1200A
SCN2A	R1319Q
CHRNA5	V134I
CHRNA2	A125T
CHRNA3	R37H
KCNQ2	K69fsX119
KCNQ2	M1V
KCNQ2	M1T
KCNQ2	R353G
KCNQ2	R430X
KCNQ2	R570S
KCNQ2	L619R

has occurred.

34. (Original) A cell as claimed in claim 33 comprising ion channels that incorporate two or more mutant polypeptides.

35. (Original) A cell as claimed in claim 33 comprising two or more ion channel types each incorporating one or more mutant polypeptides.

36. (Currently Amended) A method of preparing a polypeptide, comprising the steps of:

- (1) culturing cells as claimed in ~~any one of claims 31 to 35~~ claim 31 under conditions effective for polypeptide production; and
- (2) harvesting the polypeptide.

37. (Original) A polypeptide prepared by the method of claim 36.

38. Cancelled.

39. Cancelled.

40. Cancelled.

41. Cancelled.

42. Cancelled.

43. Cancelled.

44. Cancelled.

45. Cancelled.

46. Cancelled.

47. Cancelled.

48. Cancelled.

49. Cancelled.

50. Cancelled.

51. Cancelled.

52. Cancelled.

53. Cancelled.

54. Cancelled.

55. Cancelled.

56. Cancelled.

57. Cancelled.

58. Cancelled.

59. Cancelled.

60. Cancelled.

61. Cancelled.

62. Cancelled.

63. Cancelled.

64. Cancelled.

65. Cancelled.

66. Cancelled.

67. Cancelled.

- 68. Cancelled.
- 69. Cancelled.
- 70. Cancelled.
- 71. Cancelled.
- 72. Cancelled.
- 73. Cancelled.
- 74. Cancelled.
- 75. Cancelled.
- 76. Cancelled.
- 77. Cancelled.
- 78. Cancelled.
- 79. Cancelled.
- 80. Cancelled.
- 81. Cancelled.
- 82. Cancelled.
- 83. Cancelled.
- 84. Cancelled.
- 85. Cancelled.

86. (New) A polypeptide encoded by an isolated nucleic acid molecule as claimed in claim 8.